Keweenaw Bay Indian Community
Sand Point Cleanup Project
Analysis of Brownfield Cleanup Alternatives

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For the
Sand Point Cleanup Project
Keweenaw Bay Indian Community
Brownfield Program

SECTION 1; INTRODUCTION

The Keweenaw Bay Indian Community (KBIC) is a Federally-recognized Indian Tribe and the successor in interest of the L'Anse and Ontonagon Bands of Lake Superior Chippewa Indians. KBIC is the second largest Tribe located in the Upper Peninsula of Michigan, along the southern shore of Lake Superior in the north-central portion of the peninsula. Within the exterior boundary of the L'Anse Reservation in Baraga County there are 56,698 acres of land.

This Analysis of Brownfield Cleanup Alternatives (ABCA) is provided to outline Site cleanup alternatives evaluated by the Keweenaw Bay Indian Community (KBIC) during the planning process for the Sand Point Brownfield Cleanup Project. This ABCA will be available to the public for a period of 30 days during which comments will be solicited.

1.1 Summary

Four potential cleanup alternatives were examined for the Sand Point Brownfield Cleanup site. The major environmental concerns identified at the Site include impairments to aesthetics, wildlife habitat, the benthic environment, and impacts to soil, groundwater, surface water, and site vegetation.

Cleanup alternatives examined include no action, soil cap construction, soil cap construction and shore armoring, and excavation and disposal. Of these four alternatives, the option selected as the most feasible, is soil cap construction.

1.2 Site Description: Sand Point Brownfield Cleanup Site

The Sand Point cleanup site (the Site) is KBIC Tribal Trust property, wholly owned by KBIC and located entirely within the KBIC L'Anse Reservation boundaries. Sand Point is the name used for the entire general area between Highway 41 to the west and Lake Superior to the east. This area totals several hundred acres in size. The Site itself consists of an extensive beach area, approximately 45 acres in size, with approximately 2.5 miles of lake front, located on the west side of Keweenaw Bay of Lake Superior (Figure 1). This property has great potential for recreational development, but is currently a bare, sparsely vegetated wasteland. Lands adjacent to the Site consist of a mix of wetlands, small meadows, and pine forest. The property and surrounding areas have historically been used as a public area, for both cultural and outdoor recreational purposes, and as an access point to Keweenaw Bay and Lake Superior. Considerable archaeological data (circa 1970s) indicates that the area adjacent to the Site is a significant archaeological area, long inhabited by Native American hunting and gathering societies.

Current activities and use for the larger Sand Point area are consistent with historic use. Adjacent to the cleanup Site is the Sand Point slough, which is an area that supports wild rice, migrating waterfowl, and other wildlife. Other adjacent wetlands also support migrating waterfowl and wildlife. The larger area of Sand Point contains Tribal campgrounds, an historic lighthouse, a Tribal

marina, the KBIC Pow Wow grounds, and a pond utilized for the annual KBIC Kid's Fishing Derby. The Sand Point area is also used as an access point to Keweenaw Bay and Lake Superior during both the winter (ice-fishing and snowmobiling) and summer.

1.3 Site History

KBIC has owned the majority of the Sand Point property since the Indian Reorganization Act of 1934, including the 2.5 miles of shoreline and 45 acres of land slated for cleanup. Prior to the Indian Reorganization Act, the Sand Point property consisted primarily of Sault Ste. Marie Canal Company lands (1855), Federal lands, private lands, or allotted lands.

Environmental impacts to the Site are the result of historic deposition of copper ore processing waste (stamp sands) on the property, which occurred during the 20th century. The source of these stamp sands was an early 20th century copper ore stamp mill processing facility (the Mass Mill), located approximately 4 miles to the north of the Site. This facility processed copper ore from nearby copper mines from 1902 through 1919. Approximately six billion pounds of waste material (stamp sands) from this mill were deposited into Keweenaw Bay during operations. Following deposition into Keweenaw Bay, the stamp sands were carried southward by lake currents, and were eventually deposited onto the Site. It is estimated that currently there is between 458,000 to 550,000 yards of stamp sands over a total of 71 acres at Sand Point.

1.4 Previous Environmental Investigations and Available Information;

Reports, and data and information from historical research and environmental investigation activities implemented and completed to date at the Site, or otherwise used within this ABCA, include the following:

1. Historical newspaper articles and other materials about the Mass Mill.
2. Groundwater, Surface Water and Sediment Sampling Quality Assurance Project Plan for Sand Point (U.P. Engineers and Architects and Service Engineering Group, 2004).
3. Quality Assurance Project Plan for Fish Studies, Sand Point Brownfield Grant (SERVICE Engineering Group, 2002)
4. Groundwater, Surface Water, and Sediment Investigation, And Fish Studies for Sand Point Brownfield Grant, Baraga, Michigan (U.P. Engineers and Architects and Service Engineering Group, January, 2004)
5. Sand Point Stamp Sand Stabilization Project Summary (USDA NRCS and U.P. RC&D).
6. Quantification and Fate of Keweenaw Stamp Sand (Army Corps of Engineers, 2001)
7. Soil Characterization Report (NRCS/U.P. RC&D, 2001).
8. Sand Point Vegetative Field Trials Report (NRCS/U.P. RC&D, 2002).
9. Soil Nutrient Test Results (NRCS/U.P. RC&D, 2001).
10. Greenhouse Test Report (NRCS Plant Material, 2002)

11. Field Trial Test Report (NRCS/U.P. RC&D, 2002)
12. Sand Point Concept Master Plan (U.P. Engineers and Architects, 2004).
13. Sand Point Stamp Sand Stabilization Project Summary (USDA-NRCS, 2002).
14. Keweenaw Bay Indian Community - Integrated Resource Management Plan 2002-2012, KBIC Natural Resources Department.
15. www.epa.gov/R5Super/npl/michigan/MID980901946.htm. United States Environmental Protection Agency NPL Fact Sheet for Michigan: Torch Lake.
16. Hummer, John. "Torch Lake Area of Concern." www.epa.gov/glnpo/aoc/trchlke.html. August 28, 2001.
17. The Michigan Archaeologist. Vol. 26, Nos. 3-4 September-December 1980.
18. Lake Superior Lakewide Management Plan, 2004; Chapter 6; Status of Habitat in the Lake Superior Basin, Progress Report.
19. Communication, Data, Research File Materials, Memoranda, Letters, Misc. other information and data (2000-2006).

These documents and files are contained within the KBIC Tribal Response Program Public Record, which is held at the KBIC Pequaming Hatchery facility. Materials in the public record can be viewed during normal working hours, or by appointment by contacting Joseph Scanlan, Tribal Response Program Coordinator, at (906) 524-5757. Brownfield program information can also be found on the KBIC Government website at:

http://www.kbic-nsn.gov/html/NR/natural_resources.htm

SECTION 2; CURRENT ENVIRONMENTAL CONCERNS

2.1 Heavy Metals

The stamp sands contain elevated levels of copper, lead, cadmium and other heavy metals. Elevated heavy metals concentrations within the stamp sands are impacting Site beneficial uses (aesthetics, wildlife habitat, and the benthic environment of Lake Superior) and Site soil, groundwater, surface water, and vegetation. Heavy metals from the site may be impacting nearby fisheries.

2.2 Beneficial Use Impairments

Beneficial use impairments are present at the Site and include the following:

- Degradation of Aesthetics
- Loss of Fish and Wildlife Habitat
- Degradation of the Benthos

2.3 Degradation of Aesthetics

The stamp sands do not support vegetation growth, due to the low nutrient content, high heavy metal content, and coarse texture and dark color of the stamp sands.

Laboratory analysis of vegetation present showed that vegetation present contained high concentrations of copper, which was found to be present at concentrations considered toxic to most vegetation.

The coarse texture and dark color of the stamp sands promotes rapid drainage and evaporation of precipitation, which limits the availability of moisture to vegetation.

The lack of vegetation and the presence of dark stamp sands causes the area to resemble an industrial wasteland. Photographs of the Site are presented in Figure 2 through Figure 4.

USDA – NRCS developed vegetative test plots at the Site and conducted greenhouse trials with stamp sands. These studies indicated that the best option for promoting vegetation growth at the Site would be to install a soil cap of fine sand loam over the stamp sands. Attempts at growing vegetation on the stamp sands without a soil cap were not successful.

2.4 Loss of Fish and Wildlife Habitat

The lack of vegetation has reduced the potential biodiversity. At the Torch Lake Superfund site, soil capping has resulted in an increase in biodiversity, as noted in Chapter 6 of the Lake Superior Lakewide Management Plan (2004) Progress Report. A similar positive impact resulting in increased biodiversity is anticipated at Sand Point if a vegetated soil cap is constructed over much of the stamp sands.

2.5 Stamp Sand Erosion and the Benthic Environment

The stamp sands at the Site, and similar environmental conditions and impact are also found at the Torch Lake Superfund Site to the north of Sand Point. The Torch Lake Superfund Site also resulted from the dumping of copper ore stamp mill processing wastes (stamp sands) into nearby water bodies. An EPA report, compiled by John Hummer (2001) for the Torch Lake Superfund Site states, "… several hundred acres of the above [water] surface, unremediated stamp sand areas continue to erode into the adjacent waters at a rate of 19 to 22 tons per acre per year, constantly recontaminating the benthic [underwater] environment." The report goes on to outline a Remedial Action Plan (RAP) for the nearby Torch Lake area, also contaminated with stamp sand sediments. This report recommended remedies for OU III (Operable Units, Category Three, Contaminated upland areas and Lake Superior Shoreline), as Sand Point is categorized. "These unremediated stamp sand areas continue to erode into the adjacent waters, constantly recontaminating the benthic environment." "The most significant ecological impact is the severe degradation of the benthic communities in Torch Lake as a result of metal loadings from the mine tailings. The primary components of the selected remedy for [Torch Lake] OU I and OU III [similar to Sand Point] include a soil (6 inches of sandy loam soil) and vegetative cover over about 700 acres of tailing and slag piles to reduce metal loadings to Torch Lake and other water bodies in the area." Screening level ecological evaluation for Sand Point by EPA Region 5 suggested that high copper concentrations in sediment exceeded ecotoxicological benchmarks for sediment and surface water. The source of elevated copper in sediment has previously been shown to be copper mine wastes (i.e. stamp sands).

At Sand Point an average for the wind erosion of stamp sands would be approximately 6.9 tons per acre year on the 45 acres of exposed stamp sands. 45 acres x 6.9 tons = 310 tons per year of stamp sand sedimentation that will be prevented from entering into Lake Superior through use of a soil cover over 45 acres (Bruce Petersen, of the USDA Natural Resource Conservation Service soil savings worksheet in Public Record files). This remedy should significantly reduce further inputs of stamp sands into Keweenaw Bay from the Site, and reduce further contamination and impact to the benthic community.

2.6 Soil, Surface Water, Groundwater, Vegetation, and Fish Health

Upper Peninsula Engineers and Architects, Service Engineering Group, and USDA Natural Resource Conservation Service completed environmental site assessment work at Sand Point. Assessment results, and additional information contained within other reports and documents on file within the public record, identified the following environmental concerns due to the presence of stamp sands:

- Concentrations of heavy metals above Michigan Department of Environmental Quality (MDEQ) regulatory criteria have been found in some of the stamp sands.

- Copper, mercury, and arsenic are present in the groundwater beneath the portion of the Site that is overlain by stamp sands. Copper is present at concentrations exceeding MDEQ Groundwater-Surface water Interface Criteria.

- Copper, mercury, and arsenic are present in sediments in the small northerly most pond, the “motocross pond,” and the Sand Point slough containing wild rice beds (the northern most pond is considered a small water-filled depression in the stamp sands. Sediment in this pond consists of stamp sands, and not natural organics).

- Copper is present in surface water in the three ponds on the Site at concentrations considered by MDEQ to be harmful to aquatic organisms. Mercury is present in surface water in the northerly most pond at concentrations that may be harmful to birds and mammalian life.

- Deficiencies of major nutrients are present in the plant vegetation that is present on the stamp sand area, although the majority of the Site is devoid of vegetation.

- Near toxic levels of copper and iron are present in the plant vegetation that is present, although the majority of the Site is devoid of vegetation.

- Elevated concentrations of copper were present in some fish samples from waters adjacent to Sand Point. Arsenic and mercury were detected, but at concentrations below Michigan Department of Community Health consumption advisory levels. There are no fish consumption criteria for copper.

SECTION 3; CLEANUP ALTERNATIVES ANALYSIS

Cleanup alternatives considered for the Site include the following:

1. No Action
2. Soil Cap Construction
3. Soil Cap Construction and Shore Armoring
4. Stamp Sand Excavation and Disposal

These alternatives are discussed below and summarized in Table 1. It is currently estimated that between 458,000 and 550,000 cubic yards of stamp sands are present at the Site or 1,966,194,000 to 2,361,150,000 pounds (983,097 to 1,180,575 tons) of above water stamp sands present at the Site (specific gravity of the stamp sands at Sand Point has been determined by the ACOE as 2.71).

Both the NCRS and UPEA recommended that a soil cap of 6-10 inches in thickness, installed over stamp sands above the high water as the preferred remedial option. Planting native grasses and other vegetation would stabilize the soil cap. It was concluded that the soil and vegetative cap would improve the water quality and benthic environment of nearby portions of Lake Superior by preventing the further migration of a large amount of contaminated stamp sands into the lake, which would result in a reduction of contaminant loading to Keweenaw Bay, and an improvement to the benthic environment. In addition, the water and sediment quality of onsite water bodies would also be improved by reduction in loading from stamp sands. The amount of funding secured to date may only allow for capping of 35 acres, versus 45 acres that is hoped for. It is considered that capping of 35 acres will still result in significant environmental benefit, improvements in water quality, improvement in water and sediment quality of onsite water bodies, and improvement in the benthic environment through reduction of contaminant loading into Keweenaw Bay.

3.1 NO ACTION ALTERNATIVE

(1) Effectiveness

If no action is taken at the property ongoing erosion of stamp sands from the property will continue loading heavy metals into the benthic environment and the ponds onsite, and the property will likely remain devoid of vegetation. It is estimated by USDA-NRCS that approximately 451 tons of total stamp sand erosion into Lake Superior and adjacent water bodies is occurring each year from the entire Site (note that the entire area covered with stamp sands is greater than 45 acres; thus total input is greater than that which will be prevented if alternative 2 – capping of 45 acres – is utilized as a remedy). Natural leaching will likely reduce the concentrations of heavy metal contaminants in ground and surface water over time. The amount of time required to significantly reduce concentrations and leaching impacts would likely be many generations.

This option is considered the least environmentally protective, as it will result in continued heavy metal contaminant inputs into surface water, groundwater, nearby ponds, and the benthic environment of Lake Superior for many years to come.

(2) Implementability and cost

The no action alternative would cost nothing, be easy to implement, and would require no maintenance. There would be no required actions or technology necessary to implement this option. The time frame needed for the no action alternative to result in improved environmental conditions at the Site is unknown, as it would rely on natural leaching and erosion over time to reduce contaminant levels and loading of stamp sand to the benthic environment. Given the fact that the existing stamp sands were disposed of between 86 – 104 years ago and are still impacting the environment, the time frame for this alternative to achieve results in the form of an improved environment is likely many generations to come.

(3) Impacts during implementation

Impact during implementation of no action would include continued loading of heavy metal containing stamp sands into the benthic environment of Keweenaw Bay and onsite water bodies.

(4) Administrative Feasibility

This alternative would result in no administrative burden. No permits or approvals would be required.

(5) Ongoing Operating and Maintenance Costs

There would be no ongoing operating or maintenance costs associated with the no action alternative.

3.2 SOIL CAPPING OF THE SITE

(1) Description

This remedy involves re-grading the Site to allow for proper drainage, and capping the stamp sands above the high water mark (approximately 605 feet above mean sea level) with 6-10 inches of clean sand loam soil capable of supporting vegetation growth. Soils will be provided from KBIC Tribal Trust land located in the Ojibwa Industrial Park. The borrow soil location consists of undeveloped lots in the Ojibwa Industrial Park, at the northeastern end of Industrial Park Road (undeveloped lots 38, 39, and 42; Location map on file in the Public Record). Following construction of the soil cap, the cap will be vegetated with native vegetation appropriate for the area.

Availability of funding will determine the acreage of stamp sands covered. Currently funding has been secured for construction of a soil cap over approximately 35 acres. The goal is to ultimately cover 45 acres. The following sections discuss the option of constructing a soil cap over 45 acres. The difference between capping of 35 acres and 45 acres is discussed in Section 3.2 (7). The approximate costs of these two options is discussed in Section 3.2 (4). Additional administrative burdens will be realized should the 45 acre soil cap construction be completed in more than one stage.

(2) Effectiveness

Soil capping of stamp sands has been shown to be an effective remedy at the Torch Lake Superfund Site, and is the remedy recommended for the Sand Point Site by the Army Corps of Engineers (2001), USDA-NRCS (2002), and U.P. Engineers and Architects (2004). The Torch Lake remedial action plan was completed in 2005. A partial delisting of the Tamarack City parcel of OUI of the Torch Lake Superfund Site from the NPL occurred in January, 2004 (Federal Register: January 29, 2004 (Volume 69, Number 19)), indicating the remedy has been proven to be effective at stamp sand sites.

Based upon USDA-NRCS erosion calculations it is estimated that approximately 310 tons of stamp sands per year will be prevented from entering into Lake Superior through construction of a soil cover over 45 acres of the stamp sands (note that soil cap would be constructed on stamp sands above the high water mark of Lake Superior leaving some still uncovered and exposed). This should significantly reduce inputs of stamp sands into Keweenaw Bay from the Site, and reduce stamp sand loading and impact to the benthic environment.

In addition to significant reductions in contaminant loading to the benthic environment, it is expected that there will be a significant increase in biodiversity of the area through installation of a soil cap, and establishing a vegetative cover. Chapter 6 of the Lake Superior Lakewide Management Plan (2004), ‘Status of Habitat in the Lake Superior Basin, Progress Report’ notes that new terrestrial and aquatic habitat had been formed as a result of cleanup activities at the Torch Lake site. The report notes significant increases in small mammal and bird populations, and also notes significant increase in the number of plant species present and growing on the site.

(3) Implementability

This remedy is easily implemented using currently available construction technology and construction equipment. Earth moving equipment, such as backhoes and bulldozers will be utilized to implement the remedy. The soil cap can be constructed in one year. Vegetation will be planted during the same year and the Site will be secured for sufficient time to allow vegetation to be

established. No special equipment or techniques were required at the Torch Lake Superfund Site and none are anticipated as necessary at Sand Point.

Following completion, monitoring of the integrity of the cap will be conducted annually by KBIC. Additional work or maintenance work may be required in future years. It has been previously suggested by the ACOE (2001) that a groin installed at the southern edge of the stamp sand area may assist with reducing further migration of stamp sands to the south along the beachfront and in the littoral zone. This option will be further considered in future years during monitoring of the integrity of the soil cap.

(4) Cost

Cost of soil capping is estimated at approximately $530,000 for 45 acres. This cost includes engineering and oversight, soil cover material, and construction of the soil cap. Funding secured to date includes a combination of grant funds and KBIC Tribal funds, and is estimated as sufficient for capping of approximately 35 acres. Funding for the entire project has not been secured as of the date of completion of this ABCA.

(5) Impacts during implementation

Adverse impact to human health and the environment during implementation should be negligible. The biggest potential environmental concerns during construction include soil erosion through runoff and dust generation. Standard dust control and erosion control measures including watering, silt fencing, and temporary berms will be utilized to prevent impact to the environment during construction. Fencing installed prior to start of construction would limit human access to the project area for safety reasons. Cap construction above the high water mark will result in no work being conducted at the waters edge, which could potentially mobilize stamp sands and heavy metal bearing fine soil particles into Keweenaw Bay.

An additional adverse impact to the environment during implementation will include upgrading of a road on the north Side of the Site. This road will need to be widened slightly to allow for equipment access to the Site and for proper culverts to be installed. The road runs east to west from U.S. 41 to the Site, and borders KBIC Tire on the north side. Approximately 4000 square feet of fill will be necessary to upgrade the road (0.09 acres). The road cuts through a wetland area.

(6) Administrative Feasibility

The administrative burden for implementing this alternative is moderate to high. A large amount of staff time is required for securing and managing grant funds for cleanup, working with the engineering design contractor, securing necessary

approvals, and updating the KBIC Tribal Council and Natural Resource Committees about activities. Clearances required include State Historic Preservation Office, Tribal Historic Preservation Office, U.S. Fish and Wildlife Service, KBIC Natural Resource and Cultural Committees, Sand Point Task Force members, and the U.S. EPA Region 5. Additional permits required for implementation are currently being determined.

Should additional funding not be secured this year for capping of the entire 45 acres, and a soil cap is constructed over 35 acres, additional administrative and cost burdens will be realized to complete the project to construct a soil cap over the remaining 10 acres. These will include additional mobilization/demobilization costs for capping of the remaining 10 acres, additional staff time for securing and managing funds, additional project coordination, additional contract bidding time, additional contractor management, and additional permitting cycles.

(7) Ongoing Operating and Maintenance Costs

Ongoing operational costs are unknown. KBIC will conduct annual inspections of the integrity of the soil cap. It is possible that small portions of the cap will need refurbishing through addition of soil or additional vegetation plantings. These would most likely result in minor additional costs.

(8) Soil Cap Construction over 35 Acres Versus 45 Acres

Should available funding not be sufficient for construction of a soil cap over 45 acres, approximately 35 acres will be capped with available funding and additional funds will be pursued for capping of the remaining portion (anticipated as 10 acres). Capping of 35 acres will still result in significant reductions in contaminant loading to the benthic environment, and it is expected that there will be an increase in biodiversity over the 35 acres that is covered through installation of a soil cap and establishing a vegetative cover. Construction of a soil cap over 35 acres is anticipated to result in a reduction of stamp sand erosion from the Site by approximately 241 tons per year (approximately 78% of that realized from covering 45 acres), which will be a significant reduction in contaminant loading to the benthic environment. This will accomplish the environmental goals of the cleanup, although not to the extent desired. Aesthetics will also be improved over the 35 acres over which a soil cap is constructed.

The environmental impact not addressed on the remaining 10 acres will include aesthetic impacts, no change in biodiversity, and continued erosion of approximately 69 tons (22% less than covering of 45 acres) of stamp sands and subsequent loading to the benthic environment.

3.3 SOIL CAP INSTALLATION AND SHORE ARMORING

Refer to the above discussion for soil cap installation analysis. Shore armoring is discussed below.

(1) Description

Shore armoring, in addition to a soil cap, would involve placement of both steel sheet-pile and a stone revetment (building a large stone bank or wall) along the beach front at the Site to keep beach-front stamp sands from moving due to wave action and currents. A stone revetment would need to be sufficiently high to prevent erosion due to wave run-up at the Site. The toe section of the stone structure would need to extend to sufficient depth to prevent undermining and failure of the revetment. Placement of large stone would not be practical along much of the shoreline due to the steep drop off of the lake bottom away from Sand Point. At several locations along the Site beach front the lake depth is over 100-feet within 20 feet of the shore.

(2) Effectiveness

Shore armoring would be effective at reducing erosion and discharge of stamp sands from the bank of the beach into the littoral zone and, ultimately, deeper into the lake. Shore armoring would not be effective in the deeper littoral zone.

(3) Implementability

This remedy would be difficult to implement. The technology and equipment to complete the work is not readily available. Sheet pile installation and installation of large and heavy rock for revetment construction would require specialized heavy equipment. Transport of large rock and installation of sheet pile or large rock is difficult and time consuming. The amount of time needed for construction would likely encompass several construction seasons. Working in the beach front area would be hampered at times by severe weather, high waves, and ice during the winter.

(4) Cost

At a rough cost of $250 - $350 per foot of shoreline for armoring (USDA-NRCS, Bruce Peterson, Baraga Office, Personal Communication, 3/16/06), shore armoring would cost between $3.3 and $4 million dollars for 2.5 miles of shoreline on which stamp sands are present.

(5) Impacts during implementation

During construction stamp sands would likely be unavoidably mobilized. Fines contained within the stamp sands would be re-suspended and likely would be carried south and east into the bay. This action would potentially result in a temporary flux of contaminant loading into the benthic environment and possibly a reduction in water quality.

An additional adverse impact to the environment during implementation will include upgrading of a road on the north Side of the Site. This road will need to be widened slightly to allow for equipment access to the Site and for proper culverts to be installed. The road runs east to west from U.S. 41 to the Site, and borders KBIC Tire on the north side. Approximately 4000 square feet of fill will be necessary to upgrade the road (0.09 acres). The road cuts through a wetland area.

(6) Administrative Feasibility

The administrative burden for implementing this alternative would be very high. The significant amount of grant and/or loan funding this alternative would require would require significant amounts of staff time for fund management. Additionally, it is unlikely that enough grant funding could be secured to fully complete the project, which would require significant contributions from the KBIC Community or, alternatively, loans to be utilized for cleanup. Grant funding cycles are generally 1-2 years in length and fund sources generally have ceiling limits on the award amount. Timing enough grant fund cycles so that the excavation and removal was fully funded during one single time period would likely not be possible. Irregular timing would result in interrupted work cycles, high Site maintenance expense between work periods, repeated contractor mobilization/demobilization costs, and possibly an incomplete project. Clearances required would include State Historic Preservation Office, Tribal Historic Preservation Office, U.S. Fish and Wildlife Service, KBIC Natural Resource and Cultural Committees, Sand Point Task Force, and the U.S. EPA Region 5. Permits would be required from the Army Corps of Engineers, and the U.S. EPA Water Division. The State of Michigan would likely claim permitting jurisdiction over bottomlands of Lake Superior for work conducted in the bottomlands. Jurisdictional issues can be time-consuming to resolve. Timing of required permits, particularly from the Army Corps for shoreline construction activity at the beach front would be difficult to incorporate in the grant funding cycles. Securing permits might be difficult as well. Permits would need to be secured prior to obtaining funding. The risk of permits expiring prior to completion of the project would be an ongoing issue.

(7) Ongoing Operating and Maintenance Costs

Ongoing operational costs are unknown. KBIC would conduct annual inspections of the integrity of the soil cap and the stone revetment and sheet piling. It is likely that small portions of the cap would need refurbishing through addition of soil or additional vegetation plantings. These would most likely result in minor annual costs. Refurbishing of the stone revetment or sheet piling would likely be expensive and could result in significant additional future costs should specialized heavy equipment be required.

3.4 STAMP SAND EXCAVATION AND DISPOSAL

(1) Description

Excavation and disposal of stamp sands would involve excavation and loading of stamp sand from the Site into trucks, and hauling material to an off site disposal facility. The off site disposal facility would either be an existing landfill that agreed to accept stamp sands for disposal, or a landfill constructed specifically for disposal and containment of the stamp sands.

(2) Effectiveness

Excavation and disposal of stamp sands would be an effective method of removing contaminants from the environment and reducing existing or potential future impacts. It is unlikely that it would be feasible to remove all stamp sands present. In addition, excavation and removal of stamp sands from the littoral zone would likely not be possible.

(3) Implementability

This remedy could be implemented using standard available technology. Excavation along the beach front, in a manner that did not mobilize and result in discharge of a significant amount of stamp sands into Keweenaw Bay, would not likely be possible with current excavation technology, although specialized dredging equipment could potentially be used. Dredging equipment is not effective in all situations however.

(4) Cost

The cost of implementing this action is prohibitive. USDA estimates that approximately 458,000 to 550,000 yards of stamp sands are present at Sand Point. With a specific gravity of approximately 2.71 (ACOE, 2001) the total tonnage is estimated at between 983,097 and 1,180,575 tons. Using a standard landfill disposal cost of approximately $60 per ton (Waste Management K&W Landfill near Greenland, Michigan), cost for disposal would be between $58 and $71 million dollars. Cost of haulage is roughly estimated at $1.2 and $1.6 million dollars (standard haul fee of $1.75 per mile). Additional costs would include excavation labor and equipment, oversight time, fencing, and other items.

Clean fill would likely be required to replace excavated areas to keep the Sand Point Site as usable property. Without fill replacement, large portions of the Site could end up as water filled depressions. The approximate cost of fill at $3 per yard (current approximate price for clean fill), for between 458,000 and 550,000 cubic yards of replacement soils (approximate volume of stamp sands) would be between $1.37 and $1.65 million dollars.

If a separate disposal facility was constructed for stamp sand disposal significant additional cost would result.

(5) Impacts during implementation

Impact to the environment during implementation would likely occur. Excavation of stamp sands would likely result in the release of stamp sands into the benthic environment of Lake Superior. Using standard excavation technology at the water's edge would likely result in significant mobilization of stamp sands, even though precautions would be taken to minimize this mobilization. Fines contained within the stamp sands would likely be re-suspended. If re-suspended, fines would be carried south and east into the bay by current action in the bay. This would potentially result in a temporary flux of contaminant loading into the benthic environment and possibly a reduction in water quality.

An additional adverse impact to the environment during implementation will include upgrading of a road on the north Side of the Site. This road will need to be widened slightly to allow for equipment access to the Site and for proper culverts to be installed. The road runs east to west from U.S. 41 to the Site, and borders KBIC Tire on the north side. Approximately 4000 square feet of fill will be necessary to upgrade the road (0.09 acres). The road cuts through a wetland area.

(6) Administrative Feasibility

The administrative burden for implementing this alternative would be very high. The significant amount of grant and/or loan funding this alternative would require would require significant amounts of staff time for fund management. Additionally, it is unlikely that enough grant funding could be secured to fully complete this alternative, which would likely require significant contributions from the KBIC Community, or, alternatively, loans to be utilized for cleanup. Grant funding cycles are generally 1-2 years in length and fund sources generally have ceiling limits on the award amount. Timing enough grant fund cycles so that the excavation and removal was fully funded during one single time period would likely not be possible. Irregular timing would result in interrupted work cycles, high Site maintenance expense between work periods, repeated contractor mobilization/demobilization costs, and possibly an incomplete project. Clearances required would include State Historic Preservation Office, Tribal Historic Preservation Office, U.S. Fish and Wildlife Service, KBIC Natural Resource and Cultural Committees, Sand Point Task Force, and the U.S. EPA Region 5. Permits would be required from the Army Corps of Engineers, and the U.S. EPA Water Division. The State of Michigan would likely claim permitting jurisdiction over bottomlands of Lake Superior. Jurisdictional issues can be time-consuming to resolve. Timing of required permits, particularly from the Army Corps for dredging activity at the beach front would be difficult to incorporate in the grant funding cycles. Permits would need to be secured prior to obtaining

funding. The risk of permits expiring prior to completion of the project would be an ongoing issue.

(7) Ongoing Operating and Maintenance Costs

Ongoing operational costs would only be required should significant additional areas of stamp sands requiring removal be discovered.

SECTION 4; RECOMMENDED ALTERNATIVE

Alternatives are summarized in Table 1. The recommended alternative is Alternative 2, soil capping of stamp sands above the high water mark. The no-action alternative would result in continued loading of the benthic environment with stamp sands, resulting in continued environmental impact. Alternatives 3 and 4 have a very high administrative burden, and could potentially cause significant environmental impact during implementation. In addition, the likely cost of implementing either Alternative 3 or 4 renders them unfeasible. These costs are beyond what could reasonably be secured through grant awards, and are more than KBIC could reasonably afford to bear.

Alternative 2 is feasible, has a manageable administrative burden, is likely to be affordable, will result in significant environmental benefit through reduction of contaminated sediment loading into Keweenaw Bay, is unlikely to result in environmental impact during implementation, and will allow for continued development of the Sand Point area following guidelines as outlined in the Sand Point Master Plan Concept (see below).

SECTION 5; SUMMARY OF SAND POINT MASTER PLAN CONCEPT

The Sand Point Master Plan Concept has been adopted by the Keweenaw Bay Indian Community for development of the larger Sand Point area. This plan describes how the Community plans to transform the Sand Point area into a multi-use recreational park. The long-range goal is to incorporate attractive greenspace and efficient landscape designs into this area, and to promote the area for tourism. This brownfield cleanup project of 45 acres of the area will help contribute to the economic resources of the Community and the larger surrounding Sand Point area by helping to stimulate tourism. As the Community's recreational base grows, the intent is to remain responsible stewards of the environment by protecting these valuable resources.

The cleanup alternative proposed above will result in significant environmental benefit through reduction of contaminant loading and through an increase in biodiversity for the Sand Point area.

When the tasks of this proposed cleanup project have been realized, the results and benefits will continue and remain in existence to serve generations of Keweenaw Bay Tribal members to come, long after the EPA funding is exhausted.

SECTION 6; CLEANUP STANDARDS

Since soil cap construction does not involve removal of contaminants or contaminated materials, but consists of installation of a soil cap over the stamp sands, numerical cleanup standards will not apply to the project. The cleanup standard used will be area of stamp sands covered. This number will be reported as “acres cleaned up.” Oversight during construction and installation of the soil cap will ensure that the cap is constructed to sufficient thickness to support and maintain vegetation growth. Coverage will be determined according to engineering drawings and visually during construction of the soil cap. Vegetation growth will be monitored with time and will help ensure the integrity of the soil cap is established and maintained. The ultimate cleanup goal for Sand Point is 45 “acres cleaned up.” Funding secured to date is sufficient for achieving approximately 35 “acres cleaned up.” Actual results will be determined by actual costs (currently only estimated costs are available) and the amount of funding KBIC is able to secure.

SECTION 7; DECISION DOCUMENT

This ABCA will be available for public comment for a period of 30 days, following which a decision document will be released.

Table 1
Sand Point Cleanup Alternatives Analysis

Cleanup Alternative	Effectiveness	Implementability	Cost	Administrative Burden	Impacts during implementation	Ongoing Operating and Maintenance Costs	Main Negative Alternative Aspects
No Action	Would not reduce ongoing environmental impact	No actions necessary	None	None	Continuation of current impacts	None	No change in current conditions
Soil Cover	Effective with reduction of stamp sand erosion into Lake, increase in biodiversity, increase in vegetation growth and aesthetics.	Can be implemented with standard technology	$530,000	Moderate to high	Minimal impact; Standard erosion control measures will suffice to prevent impacts during implementation.	Likely some ongoing future cost; considered likely to be minimal	Does not address beach front stamp sands
Soil Cover and Shore Armoring	Effective with reduction of stamp sand erosion into Lake, increase in biodiversity, increase in vegetation growth and aesthetics	Specialized equipment and techniques necessary. Multi-year project.	$4+ million	Very high	Likely impact to Lake Superior through erosion and suspension of stamp sands	Potentially high	Administrative burdens and costs are prohibitive
Excavation and Disposal	Effective	Generally standard excavation techniques. Possibly some specialized equipment.	$70+ million	Very high	Likely impact to Lake Superior through erosion and suspension of stamp sands	Likely low	Administrative burdens and costs are prohibitive

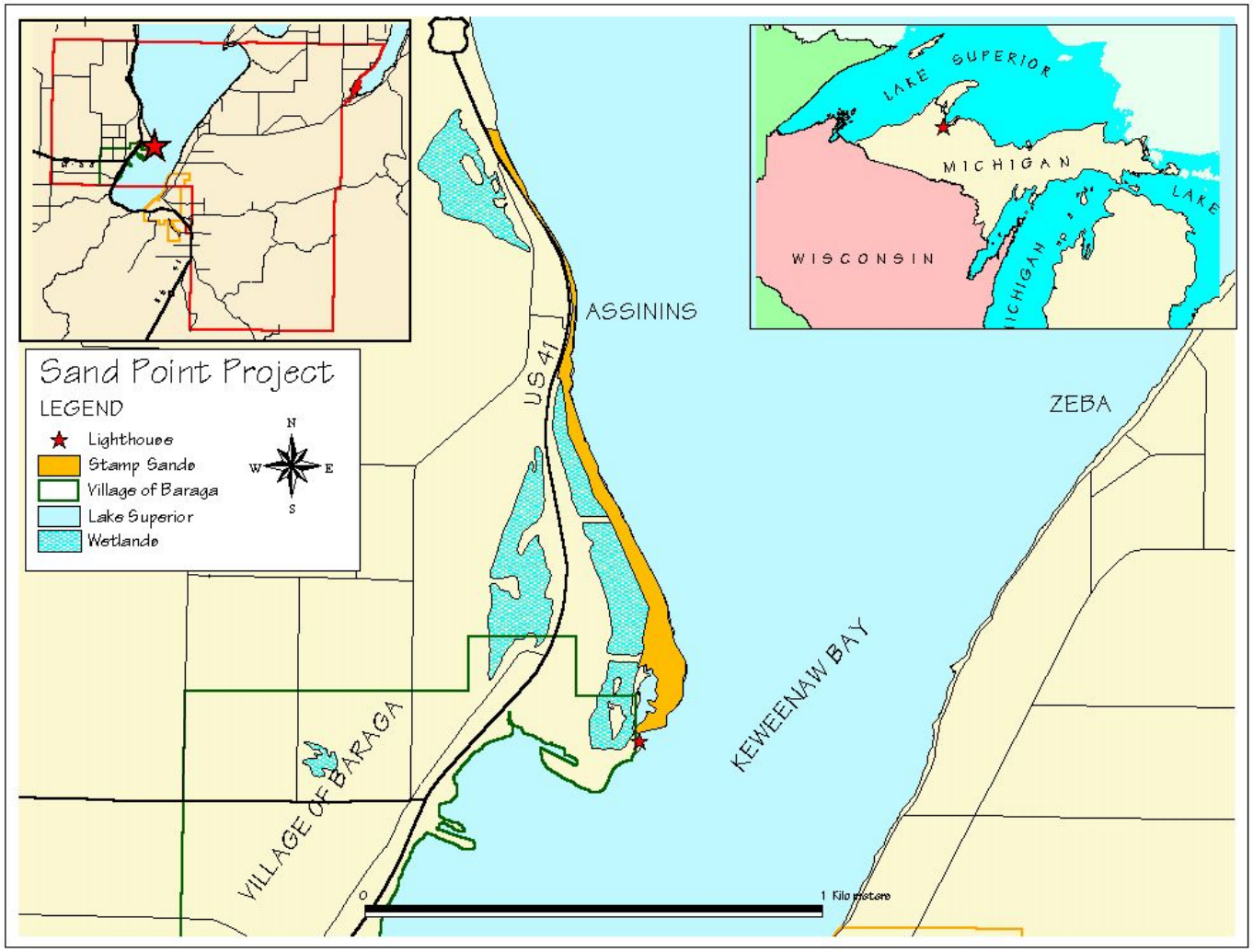

Figure 1 Sand Point Site

Figure 2 – Stamp Sands on Northern Portion of Site

Figure 3 – Stamp Sands on North Central Portion of Site

Figure 4 – Stamp Sands on South Central Portion of Site

Figure 5 – Stamp Sands on Southern Portion of Site